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SELLING
BLACK WALNUT
TIMBER



BLACK WALNUT is a two to three million-dollar timber crop that comes not from extensive forests but from scattered single trees or small groups of trees on farms in 33 States. To make money for its producers it must be cut and marketed intelligently. The farmer must have some knowledge of logging, timber appraising, log scaling, and marketing if he is to realize a profitable return on this valuable by-product of his farm. The purpose of this bulletin is to give him in brief and without technicalities the information he needs.

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SELLING BLACK WALNUT TIMBER

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BLACK WALNUT AS A FARM CROP

BLACK WALNUT (*Juglans nigra* L.) grows best on agricultural lands, and manufacturers of walnut lumber and veneers depend on the farmers for their supplies of logs.

In Ohio, Indiana, Illinois, Kentucky, Tennessee, Missouri, Iowa, and 26 other States (fig. 1) walnut grows naturally on farm land and in most cases can yield the farmer a good return if properly marketed. Farmers in these States have sold as much as \$2,500,000 worth of walnut logs annually—a substantial item in the sum total of diversified farming.

Manufacturers want black walnut because of qualities no other wood has in the same combination. It works well with tools. It holds its shape in seasoning. It shrinks, swells, and warps very little in the finished product. It takes a good finish, and when finished has a very attractive appearance.

Black-walnut trees bring higher prices than any other kind of timber grown on the farm, and the general trend of these prices has been upward since 1915. Walnut is primarily a good wood for cabinetwork and furniture making of all kinds. Other cabinet woods, as well as walnut, are growing scarce. This has the effect of increasing the price of walnut, and its value will in all probability be higher in the future.

PRACTICAL SUGGESTIONS ON SELLING

In order to dispose of his timber to good advantage the walnut owner needs to know something of how to appraise and scale his logs, and how to cut and market them. As far as regards the actual selling of his timber, the things he must know are: (1) The sizes and grades of walnut logs for which the buyer will pay highest prices; (2) how his crop grades and how much it amounts to; (3) how to reach the best market; (4) how to sell to the best advantage; (5) what prices his timber should bring.

MARKET SPECIFICATIONS FOR LOGS

Black-walnut logs may be classed into four grades. These are, in order of importance, No. 1 veneer (or "Veneer") No. 1 lumber (or "Good," or "Good Mill"), No. 2 lumber (or "Common"), No. 3 lumber (or "Cull"). Not all of these grades are employed by every manufacturer; some firms do not have a veneer log grade, and include logs suitable for veneer in the grade "No. 1 lumber." Walnut

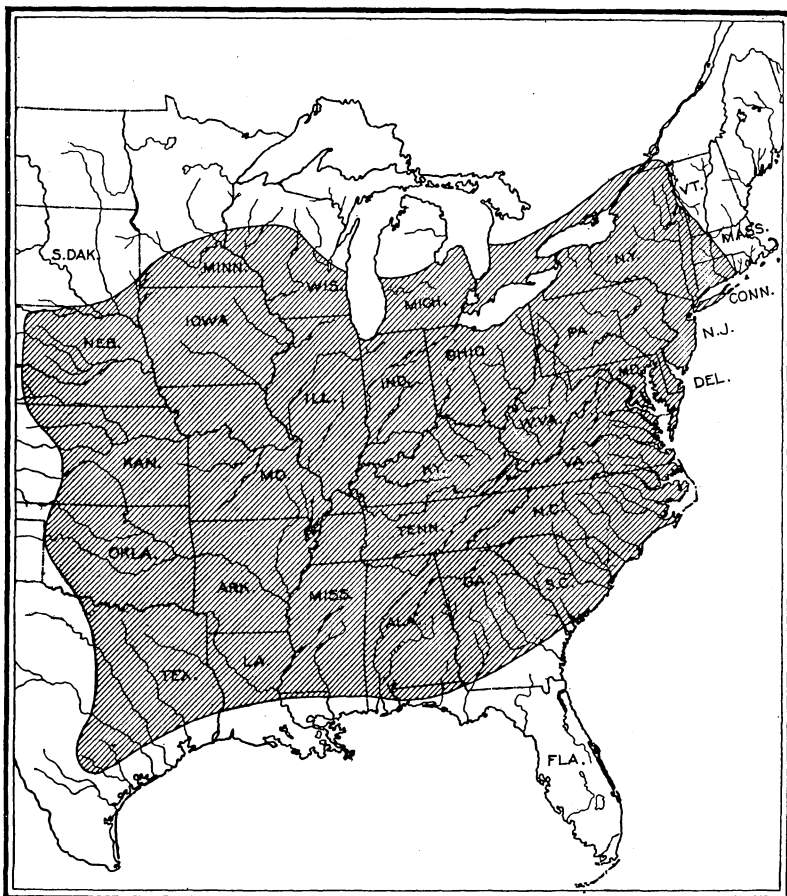


Fig. 1.—Botanical range of black walnut.

stumps are not separated into grades because the value of each stump must be judged separately.

Veneer logs are the very best in freedom from blemishes of any kind and are required to be practically free of all visible defects,¹ such as knots, rot, and splits,² and must be smooth and straight.

¹ Any irregularity in the wood that lowers its quality.

² These defects, particularly splits and rot, often can not be detected in the standing timber. A split is merely a lengthwise separation of the wood.

At most a small sound knot near the end of the log may be allowed. Frequently a limitation is placed on the amount of sapwood or the lighter outer wood, as distinguished from the darker heartwood, that the veneer log shows. This limitation is applied to the smaller logs in which the heartwood is not greatly developed. Three or even two inches of sapwood is often enough to disqualify the smaller logs for this grade. The smallest diameter (measured at the small end) of logs that are admitted in this grade varies from 16 to 20 inches with different firms. Some firms will accept logs in the veneer grade somewhat smaller than their specifications call for if they are of unusually good quality, clear, straight, round in cross-section, and with a very thin rim of sapwood. The shortest length of log allowed in this grade is 6 feet.

No. 1 lumber, Good or Good Mill, calls for logs clear of defects or practically clear and straight or reasonably straight. Some firms have very definite specifications describing the kind and number of defects allowable, such as knots, rot, splits, shakes, and checks.³ These defects are sometimes limited to within 1 foot of the end of the log, or in larger sizes of logs one such defect may be allowed regardless of location. Holes and two or more hearts⁴ are also classed as defects.

The diameter is usually specified at not less than 12 inches at the small end inside the bark. Some purchasers take none less than 14 inches or possibly accept only a few in this grade at 12 and 13 inches in diameter.

Lengths are commonly 8 to 16 feet in 1-foot intervals (that is, 8, 9, 10, etc.). In some cases there is a limitation on the proportion of lengths under 10 feet. Some firms allow a few 6 and 7 foot lengths, particularly if the logs are large and of good quality. In general, buyers require the smaller sizes and shorter lengths to be practically clear, and allow more defects in the larger and longer logs.

No. 2 and particularly No. 3 lumber log grades are often not specified. These grades cover short lengths, smaller diameters, and more defective material than the other grades.

The No. 2, or Common, grade generally includes a large number of the smaller logs, which are too defective to go into the No. 1 grade, such as those containing a considerable number of knots, bad checks, and splits, and some rot. Logs in this grade must, however, contain a large proportion of good quality wood. Logs as small as 10 inches in diameter, if clear of defects, may be included in this grade, but 12 inches is the usual smallest diameter. The usual length specified is 6 feet and over.

No. 3, or Cull, logs are very defective, but must be capable of producing some good lumber. Small clear logs 10 and 11 inches in diameter may be included in this grade, and logs in which metal, such as fencing and nails, has been imbedded. The specified length is 6 feet and over. Many firms will not buy either of these grades

³ A shake is a separation of the wood occurring principally along or between the growth rings; that is, in a circular direction as seen on the end of the log. A check is a separation of the wood extending across the growth rings. These can not usually be seen in the standing timber.

⁴ The center of the growth rings as seen on the end of the log is termed the "heart."

because the cost of transportation is too great to make their purchase profitable.

Following are examples of actual specifications for the four different log grades and give a fair idea of what may be required:

Veneer.—Logs 18 inches and up in diameter, at least 8 feet long; free of all visible defects except occasionally a sound knot near the end; straight and not too sappy.

No. 1 lumber.—Logs 12 inches and up in diameter, sound ended, straight, with not more than two sound knots; 8 to 16 feet long, with not more than 25 per cent of 8 and 9 foot lengths.

No. 2 lumber.—Logs 12 inches and up in diameter exclusive of badly crooked and shaky logs, of logs with bark sores,⁵ and logs containing more than four knots; 6 to 16 feet long, with not more than 30 per cent less than 10 feet.

No. 3 lumber.—All logs below the grade of No. 2, but which in the inspector's opinion will produce some good lumber. This grade includes all clear logs 11 inches in diameter, also all logs containing windshake or evidence of having iron or other metal imbedded in them.

Some firms make a deduction in measurement for holes and decay instead of placing the logs in a lower grade. The general character of the log must be very good, however, to allow its admission in the better grade with such a deduction.

Black-walnut stumps are used in the manufacture of veneer. To be valuable a stump must have a wavy or irregular grain, called "figure," which is most often present in the wood at the curved portion at the base of the tree where the roots extend out from the trunk. This figure, if discernible in the standing tree, is generally indicated by irregular bark ridges or by a ridged surface under the bark.

Since this figured condition is not easily determined by one who is unfamiliar with it, the decision as to whether a stump is figured must generally be left to the buyer. Figured stumps are required to have a minimum diameter of 21 or 22 inches at the upper end and a length of at least 3 feet. They should be practically free from defects such as cracks, crevices, and rot. To bring the best prices stumps should be figured for at least two-thirds of their length. Those with less figure are sometimes classed as No. 2 stumps and bring a lower price.

Stumps are usually sold in the same way as logs, by the board foot, log scale, according to length and diameter inside bark at the small end.

ESTIMATING STANDING TIMBER

There are several reasons why the owner of black-walnut timber should determine as nearly as he can the amount of timber he has for sale.

(1) He will know whether he has a sufficient quantity to warrant shipment of the logs.

(2) He can get some idea of how much his timber should bring him.

(3) He can tell prospective buyers about how much he has that is salable.

⁵ An irregular growth of the bark, indicating a knot or other defective growth of the wood underneath.

(4) If the timber is sold standing, it will serve as a check against the buyer's estimate and may help the owner to get a fair price for it.

If the owner has not had previous experience in measuring and estimating timber, his results may be far from accurate. This is particularly true in regard to determining the value, for the price depends so largely on the nature of the defects present. Even a rough estimate, however, will be of value and will enable him to deal with the buyer to better advantage.

In estimating timber it is necessary to determine the number of logs and the size of each that can be cut from the standing tree.

Timber is commonly purchased on the board-foot basis, the number of board feet in any log depending on its length and its diameter.

Table 1 gives the number of board feet in logs of different sizes according to the Doyle log rule, which is the log rule commonly used in measuring black walnut timber. The Doyle rule, however, is known to be very inaccurate, particularly in the small diameters, and is disadvantageous to the seller of logs. The sale of logs by the International rule, which gives values very close to the actual yield of the log when sawed into lumber, is advisable.⁶

It will be seen from Table 1 that the number of board feet in a log increases greatly with an increase in diameter. As the value of each thousand board feet in a log also increases greatly with increased diameter, it follows that it is advantageous to the seller to convert his trees into logs which have the largest possible diameters at the small end and at the same time conform to the specifications of the buyer. It is also important, of course, that the logs be of as high quality as possible. If a log is to be classed high in quality, serious defects, such as knots, should be located near the end of the log. Where it can be done, therefore, it is advantageous to cut the tree into lengths at the location of such a defect. This matter of cutting the trees into log lengths is discussed more fully later in this bulletin.

⁶ The formula used in the Doyle rule is as follows: To determine the contents of a log deduct 4 from the diameter (in inches) of the small end, divide by 4, square the quotient, and multiply by the length of the log in feet. This log rule gives less than the actual amount of lumber that can be sawed from the smaller logs. For instance, a log 12 inches in diameter at the small end and 16 feet long scales 64 board feet by the Doyle rule, whereas approximately 100 board feet of lumber can be sawed from it; similarly, a log 16 inches in diameter, 16 feet long, scales 144 board feet, and it will yield about 180 board feet of lumber, as indicated in the following table:

Comparison of International and Doyle log rules

[Board-foot contents of 16-foot logs by both rules and ratio of Doyle rule to International (International=100 per cent.)]

Top diam- eter inside bark	Doyle			Top diam- eter inside bark	Doyle			Top diam- eter inside bark	Doyle		
	Inter- na- tional	Bd. ft.	Per cent		Inter- na- tional	Bd. ft.	Per cent		Inter- na- tional	Bd. ft.	Per cent
Inches	Bd. ft.	Bd. ft.	Per cent	Inches	Bd. ft.	Bd. ft.	Per cent	Inches	Bd. ft.	Bd. ft.	Per cent
6.....	20	4	20	16.....	180	144	80	26.....	500	484	97
7.....	30	9	30	17.....	205	169	82	27.....	540	529	98
8.....	40	16	40	18.....	230	196	85	28.....	585	576	98
9.....	50	25	50	19.....	260	225	87	29.....	630	625	99
10.....	65	36	55	20.....	290	256	88	30.....	675	676	100
11.....	80	49	61	21.....	320	289	90	32.....	770	784	102
12.....	95	64	67	22.....	355	324	91	34.....	875	900	103
13.....	115	81	70	23.....	390	361	93	36.....	980	1,024	104
14.....	135	100	74	24.....	425	400	94	38.....	1,095	1,156	106
15.....	160	121	76	25.....	460	441	96	40.....	1,220	1,296	106

* For saws cutting a ¼-inch kerf.

TABLE 1.—Board feet, log scale, contained in logs measured according to the Doyle log rule

Diameter small end inside bark (inches)	Length in feet										
	6	7	8	9	10	11	12	13	14	15	16
	Board feet										
6----	1	2	2	2	2	3	3	3	3	4	4
7----	3	4	4	5	5	6	7	7	8	8	9
8----	6	7	8	9	10	11	12	13	14	15	16
9----	9	11	12	14	16	17	19	20	22	23	25
10----	13	16	18	20	22	25	27	29	31	34	36
11----	18	21	24	28	31	34	37	40	43	46	49
12----	24	28	32	36	40	44	48	52	56	60	64
13----	30	35	40	46	51	56	61	66	71	76	81
14----	37	44	50	56	62	69	75	81	87	94	100
15----	45	53	60	68	76	83	91	98	106	113	121
16----	54	63	72	81	90	99	108	117	126	135	144
17----	63	74	84	95	106	116	127	137	148	158	169
18----	73	86	98	110	122	135	147	159	171	184	196
19----	84	98	112	127	141	155	169	183	197	211	225
20----	96	112	128	144	160	176	192	208	224	240	256
21----	108	126	144	163	181	199	217	235	253	271	289
22----	121	142	162	182	202	223	243	263	283	304	324
23----	135	158	180	203	226	248	271	293	316	338	361
24----	150	175	200	225	250	275	300	325	350	375	400
25----	165	193	220	248	276	303	331	358	386	413	441
26----	181	212	242	272	302	333	363	393	423	454	484
27----	198	231	264	298	331	364	397	430	463	496	529
28----	216	252	288	324	360	396	432	468	504	540	576
29----	234	273	312	352	391	430	469	508	547	586	625
30----	253	296	338	380	422	465	507	549	591	634	676
31----	273	319	364	410	456	501	547	592	638	683	729
32----	294	343	392	441	490	539	588	637	686	735	784
33----	315	368	420	473	526	578	631	683	736	788	841
34----	337	394	450	506	562	619	675	731	787	844	900
35----	360	420	480	541	601	661	721	781	841	901	961
36----	384	448	512	576	640	704	768	832	896	960	1,024
37----	408	476	544	613	681	749	817	885	953	1,021	1,089
38----	433	506	578	650	722	795	867	939	1,011	1,084	1,156
39----	459	536	612	689	766	842	919	995	1,072	1,148	1,225
40----	486	567	648	729	810	891	972	1,053	1,134	1,215	1,296

As buyers' specifications generally call for lengths from 8 to 16 feet with a small proportion 8 and 9 feet long, it is generally advantageous to cut the logs not over 12 feet in length, since in long logs the diameter at the small end is proportionately less. In some cases, however, it will be necessary to cut them longer in order to include all of the tree that is salable. This is often the case with open-growth trees, which commonly yield only one log (fig. 2). Since the thickness of the bark on the logs amounts to 1 or 1½ inches, a deduction of 2 to 3 inches should be made from the outside diameter of the tree to get the diameter inside the bark. An allowance of about 3 inches additional on the length of each log is necessary for cutting into log lengths.

Twelve inches at the small end is usually the smallest log size acceptable; therefore, smaller diameters should not be included.

In making an estimate of the timber it will be found convenient to make a list of all logs, showing the small end diameter and the length of each log in each tree, with a space for the quantity of each log in board feet to be filled in later. The following list shows how the log scale may be entered in this way. By classifying the different logs according to grade, their approximate value may be ascertained. If it is not desired to separate the logs into grades, the number of board feet may be entered in a single column.

TABLE 2—Method of entering logs

	Grade	Length (feet)	Diam- eter (inches)	Scale, board feet, by log grade			
				No. 1 veneer	No. 1 lumber	No. 2 lumber	No. 3 lumber
Tree No. 1:							
Butt log.....	No. 1 lumber.....	14	18	-----	171	-----	-----
Second log.....	No. 2 lumber.....	12	14	-----	-----	75	-----
Tree No. 2: Butt log.....	No. 1 lumber.....	16	13	-----	81	-----	-----
Tree No. 3:							
Butt log.....	No. 1 veneer.....	12	20	192	-----	-----	-----
Second log.....	No. 1 lumber.....	10	12	-----	40	-----	-----

A rough valuation of the logs may be obtained by adding together the scale in board feet for each diameter class of each log grade and



Fig. 2.—Open growth type of black walnut

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multiplying by the values given in Table 3 of this bulletin. The freight cost can also be estimated by using the approximate log weights given in Table 4. In preparing such a list of logs one should measure or estimate the diameters and lengths carefully in order to obtain dependable results.

The large tree at the left in Figure 3 should yield one high-grade butt log and possibly one other high-grade log. The tree at the left of this one will yield one long log or possibly two short ones of good quality. The tree in the middle has one butt log of high quality and one log of a lower grade. The one at the extreme right will yield one small log of doubtful quality.

Some of these trees are being used to support the fence wire in the foreground. This may result in the buyer's placing some of the butt



Fig. 3.—Small grove of black walnut trees in pasture. Illinois

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logs in a lower grade if nails or staples have been driven into the wood. If nails or staples have been in the tree for a number of years, so that they have become deeply imbedded in the wood, they are likely to ruin the saws at the mill, and therefore a log from such a tree may be rejected entirely by the buyer.

Very defective logs are not merchantable, and the general specifications given on page 2 should be consulted to determine what logs are acceptable.

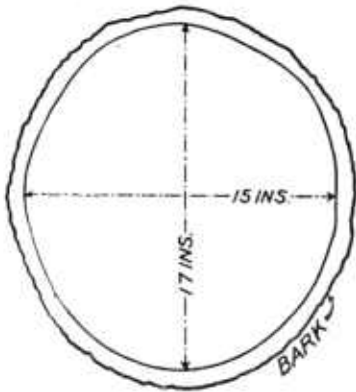


Fig. 4.—Method of measuring diameters of logs that are not round. An average is taken of the long and short diameters measured at right angles to each other. In this instance the diameter is 16 inches

SCALING LOGS

It is, of course, much easier to determine the contents of the logs after they have been cut. The diameter at the small end inside the bark can then be determined accurately with a rule, as also the length. Before cutting the log into lengths the instructions given under "How to cut walnut trees" should be consulted.

Where the log is not round at the small end the usual method of measurement is to split the difference between the longest and shortest diameters taken at right angles to each other, as shown in Figure

4. Since the long diameter in this case is 17 inches and the short diameter 15 inches, the diameter of the log is counted at 16 inches. If the log is 15 inches one way and 15½ inches the other, or if it is 15 inches one way and 16 inches the other, it is counted as 15 inches; if 15½ one way and 16½ the other, it is counted as 16 inches.

If the diameter of a log at the small end is noticeably larger than at any other point throughout its length, it is customary to take the smallest diameter, as the amount of lumber that can be sawed from a log is determined by its smallest diameter.

Table 1, giving the amount in board feet according to the Doyle rule can be applied in the same way for logs as for standing timber.

Additional information on scaling logs and estimating standing timber will be found in Farmers' Bulletin 1210, United States Department of Agriculture, "Measuring and Marketing Farm Timber."

FINDING A MARKET

Before dealing with the log buyer, timber owners should prepare a statement concerning their timber, giving location, distance from highway and railroad, and amounts of different sizes and grades of logs as accurately as can be determined. Following is a sample description:

Timber one-fourth mile from good road, 4 miles northeast of Jonesville, Brown County, Ind., 3½ miles by road from White's siding on Baltimore & Ohio Railroad.

Veneer grade:

- 1 log 19 inches in diameter at small end, 10 feet long.
- 2 logs 16 inches in diameter at small end, 12 feet long.

No. 1 lumber grade:

- 2 logs 17 inches in diameter at small end, 14 feet long.
- 4 logs 16 inches in diameter at small end, 12 feet long.
- 1 log 16 inches in diameter at small end, 14 feet long.
- 1 log 14 inches in diameter at small end, 10 feet long.

No. 2 lumber grade:

- 2 logs 14 inches in diameter at small end, 13 feet long.
- 1 log 12 inches in diameter at small end, 10 feet long.
- 2 logs 10 inches in diameter at small end, 12 feet long.

This statement may be mailed to several firms which may be interested in purchasing the timber.⁷

Where there is available a sufficient quantity of high-grade black-walnut timber to interest the large walnut manufacturer, the farmer should deal directly with him or his representative. Where there is not enough to interest the large mill, the best that can be done may be to sell the timber to the jobber who buys up walnut from farmers throughout the community and sells to manufacturers of walnut lumber and veneer. It is, of course, advisable wherever possible to deal with the manufacturer directly. It may be more advantageous to sell to the large mill than to the small sawmill, which generally turns out a lower grade product and can not afford to pay as much for high-grade logs.

Some of the large mills have local representatives who purchase logs for them whenever there is opportunity. More often, however,

⁷ A list of firms which purchase walnut will be furnished on request by the U. S. Forest Service, Washington, D. C.

the mills have regular salaried buyers who travel throughout the country districts estimating, scaling, and buying. Where there is a sufficient quantity of walnut available, such buyers will make a special trip to estimate and make an offer on the timber. It will often, therefore, be of advantage to the prospective seller to determine in a very rough way how much walnut there is available for sale in his vicinity, and to make this known to the mills he addresses, so that he will stand a better chance of obtaining the services of a mill buyer.

Although the railroads charge for a shipment according to weight, there is a fixed minimum charge for a carload, and therefore a small shipment of logs may carry an excessive freight cost. It is often advantageous for two or more farmers to combine their logs in one car.

Thus there are several advantages to be gained in marketing timber in large quantities: (1) Buyers can afford to give a better price where they handle a large quantity in one neighborhood; (2) there is more likelihood of interesting several buyers, and competition among them may result in higher prices; (3) the logs can be shipped in full carload lots, keeping the freight cost at the minimum.

Where several farmers in a neighborhood have marketable walnut they will often find it advantageous to deal with the buyer collectively, for a large quantity of timber can be disposed of more profitably than can several small quantities. Where farmers join together for the purpose of selling their timber they may wish to form a temporary organization for this purpose.

The responsibility for starting such an organization is generally assumed by one or more owners of walnut timber who are anxious to sell. These owners first get in touch with others who have timber to dispose of. The county agricultural agent can usually assist by getting up a list of those farmers who have walnut timber for sale. Owners may be asked to submit a list of their trees or logs, giving sizes and quality, for the purpose of determining the approximate amount of timber available.

The county agent may be able to help by calling a meeting of those farmers who have walnut timber and who are interested in selling it. In order to give more definite purpose to the meeting, some one should assume the duty of collecting market information and presenting it to the group. Wherever an extension forester is available he could help by explaining the methods of handling walnut timber, the sizes and quality of logs for which there is a demand, and perhaps by suggesting plans for the disposal of the timber.

At the meeting an inventory should be made of the total amount of timber available. This information can be forwarded to walnut-log buyers in order to interest them to inspect the timber and make offers on it. The buyers' offers will be made on each parcel of timber as it stands or cut into logs in the woods or delivered at the railroad. If several farmers arrange to sell their timber at the railroad, the logs of each owner should be plainly marked and piled separately.

The farmers should arrange with some one who is familiar with the measuring and grading of logs to represent them at the time when the buyer makes his inspection. He should make a check scaling and grading of all of the logs, keeping a separate record for each owner.

METHODS OF SELLING

Two general forms of sale are usually open to the timber owner—a lump-sum offer and a price by the board foot.

Lump sum.—The lump sum or price for the entire lot is often preferred by the buyer, because he is better qualified than the owner to determine very closely the quantity and value of the timber. On the other hand, selling for a lump sum eliminates the uncertainties accompanying measurement of the logs, and if the owner has obtained a knowledge of the approximate quantity and value of his timber and has secured bids from several buyers, this may be the most advantageous method of sale.

One disadvantage of selling standing timber by lump sum is that the buyer unless restricted may cut young trees, adding little, if anything, to the price offered. By saving the younger, fast-growing trees a future crop of walnut timber can be assured. If the younger growth is to be spared, there should be a definite understanding as to which trees are to be taken. This may be a stipulation in writing that trees below a certain diameter limit shall not be cut; it is preferable, however, that each tree that is to be cut be given a distinctive mark, so that there will be no misunderstanding on the part of the cutters. It is customary to "blaze" each tree to be cut at a place above the saw cut (conveniently at breast height) and also near the ground. This will leave a record on the stump and on the first log.

Board foot.—In selling according to the amount in board feet the price paid per thousand feet should vary with the diameters of the logs. This should be according to a fixed scale of prices which will specify the amount to be paid per thousand board feet for each diameter size or diameter class, for example, the diameter classes as given on page 14. To avoid later misunderstandings the seller should keep a record of the prices agreed upon.

A common method is to sell the standing timber with the understanding that it will be paid for according to the log scale after it is felled and cut into log lengths. This method of sale should work to the advantage of the seller if the felling and cutting are carefully done.

The owner should accompany the log buyer when the logs are measured. In order to satisfy himself as to the correctness of the scale, the owner may number each log and enter on a sheet of paper the diameter and length of each recorded by the buyer. A thorough familiarity with the method of measuring logs, specifications, and prices for different sizes and grades will be of great help in selling the timber to good advantage.

The farmer may sometimes have the option of disposing of his timber standing, cut into log lengths on the ground, or delivered at the railroad or on board cars. He will generally find it to his advantage to do the work of cutting, hauling, and loading on cars, if he has the necessary equipment, for thereby he will get the extra price al-

lowed. This work may well be done during the winter or at times when other farm work is not pressing.

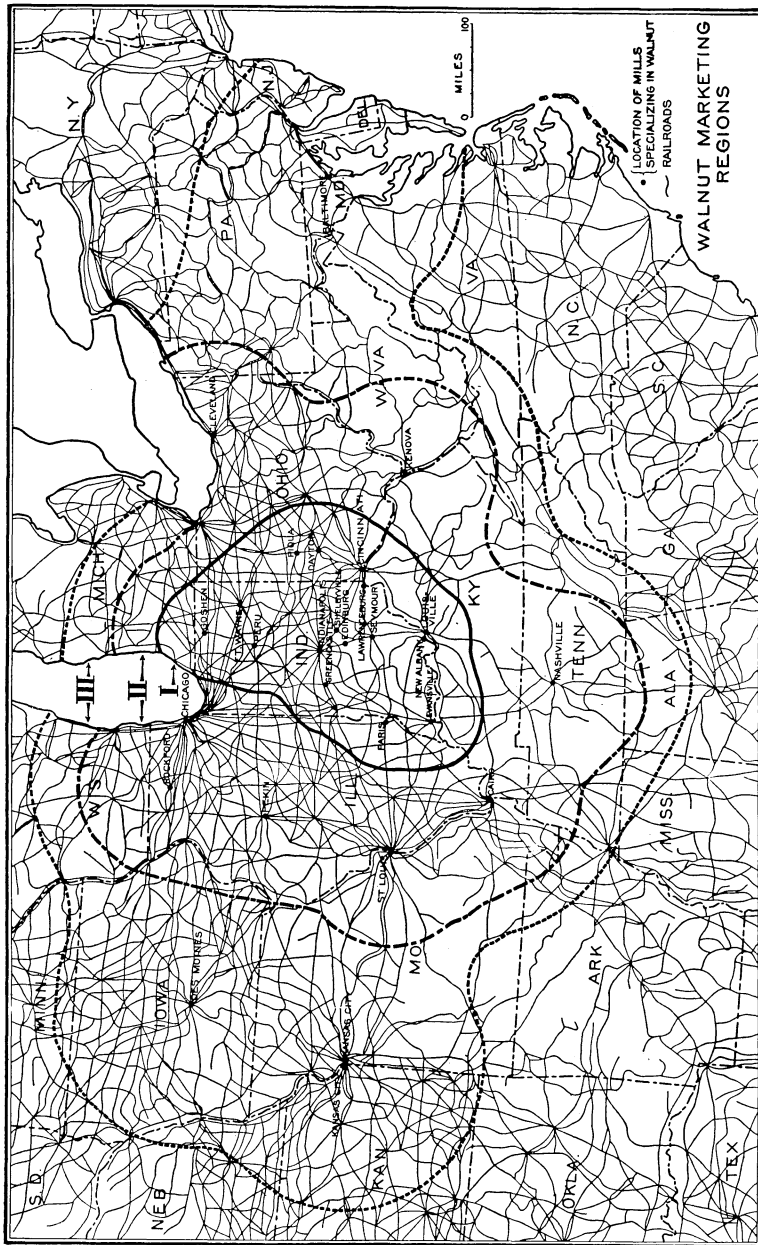


Fig. 5.—This map indicates the relative advantages of different regions and localities for marketing walnut. In Area I no point is farther distant than 50 miles from a mill using walnut; in Area II no point is farther distant than 100 miles; and in Area III the greatest distance from a mill purchasing walnut is about 150 miles. The more conveniently the timber is located to the railroad and the nearer to the mill the better the price it should bring.

Usually it is undesirable to sell logs subject to inspection at the mill, since this is likely to lead to disputes over the log scale, possibly to the rejection of logs after they have been hauled long distances, and to other misunderstandings.

A commendable plan of purchase by the board foot is as follows:

An inspector is sent to measure the logs at the railroad right-of-way, and as soon as they are measured a check made out to the seller is deposited in his bank. After the logs have been shipped, the railroad company's receipted bill of lading is delivered to the bank. The bank is then automatically authorized to turn the money over to the seller.

For aid in determining the possible profits from a logging venture consult figures given on page 19. These are estimated costs used by walnut-timber buyers for cutting, hauling, and loading on cars.

Prices.—The prices paid for black-walnut logs vary widely, depending mainly on their quality, size, and location. Logs at the mill naturally bring higher prices than logs in the woods or delivered at the railroad. Since freight is a large item of cost the value of standing timber will depend greatly on the distance from the mill where it is to be converted into lumber or veneer. Figure 5 gives the location of mills which specialize in black walnut. Distances from mills are indicated by the three areas shown. In Area I no place is farther distant than 50 miles from a mill, in Area II no place is farther distant than 100 miles, and in Area III the greatest distance from a mill is about 150 miles. In Area I, therefore, the value of standing timber is in general higher than in Areas II or III and in Area II higher than in Area III. Outside of these areas the value on the average is, of course, even less.

Since values vary so greatly with distances from the standing timber to the railroad and from railroad to mill, prices at the mill only will be given. From these the values at the railroad and in the woods may be roughly approximated by referring to the sections on log weights and freight rates and costs of felling and hauling.

There is considerable range in the prices at the mill quoted by different firms. This range is in part due to the fact that some firms require a somewhat better quality of logs than others. In sections of the country where the logs run poorer in quality firms must accept a poorer grade of logs, and the price is correspondingly lower. Where the timber is scattered and far from the mill the general tendency is also toward a lower price.

Table 3 indicates the price range for logs of different sizes and grades. The figures given apply to logs in carload lots at the mill. Prices for No. 3 grade logs are not given, because when they are purchased the price is fixed at whatever the purchaser wishes to pay for them. The great variation in price for No. 1 lumber logs is due largely to the different quality of logs included in this grade by different firms. Those which manufacture lumber only will naturally include better logs in the lumber grade than those which make both lumber and veneer, and have separate veneer and lumber log grades.

These prices are a little higher than those prevailing soon after the World War and are very much more than those paid before the war. If the present demand for walnut furniture is maintained it is probable that the prices for walnut timber will increase with its growing scarcity. In any event, because of the value of the wood for a number of uses the price is not likely to drop.

TABLE 3.—General range of prices paid at the mill by large walnut mills in 1924, for different sizes and grades of black-walnut logs in carload quantities

Diameter at small end of log inside bark (inches)	Prices per 1,000 board feet Doyle log scale, by log grades			Diameter at small end of log inside bark (inches)	Prices per 1,000 board feet Doyle log scale, by log grades		
	Veneer ¹	No. 1 lumber ²	No. 2 lumber ³		Veneer ¹	No. 1 lumber ²	No. 2 lumber ³
12 and 13-----		\$50-\$100	\$30-\$65	22 and 23-----	\$125-\$225	\$65-\$150	\$50-\$75
14 and 15-----		60- 110	30- 70	24 and 25-----	150- 250	65- 175	50- 75
16 and 17-----	\$75-\$150	65- 120	40- 75	26 and 27-----	150- 275	65- 175	50- 75
18 and 19-----	100- 175	65- 125	40- 75	28 and 29-----	175- 300	65- 200	50- 75
20 and 21-----	100- 200	65- 125	40- 75	30 and over-----	200- 300	65- 200	50- 75

¹ Also sometimes called "Prime Veneer."² This grade is often termed "Good" or "Good Mill." See specifications, page 3.³ Sometimes designated as "Common."

Logs with special figure, such as curly and wavy grain, should bring higher prices than plain logs, especially large logs with such figure. The price depends very largely on the extent and quality of the figure and may run as high as \$500 a thousand board feet or even higher for very large, highly figured logs. As a general rule only the experienced log buyer is able to recognize figured logs, so that in most cases he must be depended on to give a fair price for such logs when they are discovered. Figured stumps generally bring from \$250 to \$350 a thousand board feet when sold by the log scale. If very large and well figured, they may bring as much as \$600 a thousand board feet or even more for very choice material. It should be remembered in this connection, however, that only those stumps are of special value, that have a sufficient amount of the valuable crinkle or ripple-mark figure and are capable of being converted into high quality veneer. As already stated, their value is a matter which must usually be left to the log buyer.

The walnut burl is a peculiar growth which is often of great value for the manufacture of veneer. The burl generally has the appearance of a huge wart. The best ones are usually turnip-shaped, and typical specimens are covered with little conical spines. As a general thing only the so-called "root burls," which grow on the stump or root of the tree, are valuable; those higher up on the trunk or on large limbs are generally full of cavities. A burl should contain sound, solid wood in order to be of value for cutting into veneer. Burls of high value have been found on the roots below the surface of the ground; they are very rare, however. Burls are generally sold by weight and the price paid is usually 10 or 15 cents a pound.

HOW TO CUT BLACK WALNUT TREES TO BEST ADVANTAGE

LOGS

The quality and value of the log frequently can be increased by care in cutting the tree into log lengths after it is felled. The important thing to keep in mind is to cut the merchantable portion of the tree into such lengths that the logs will be of the highest quality and at the same time contain the largest quantity of merchantable material. Generally the logs should be cut at a crook,

eroteh, or knot wherever practicable, in order to get as straight and clear lengths as possible. For instance, the tree shown in Figure 6 should be cut at the large knot which is about 10 feet above the ground. Another log can probably be obtained above this knot.

One should avoid including extra length in logs that taper rapidly at the upper end, as this will reduce the scale of the log. For



Fig. 6.—This black walnut tree when sawed into log lengths should be cut at the large knot located about 10 feet from the ground

instance, a certain log cut 16 feet long has a diameter of 14 inches at the small end because of excessive taper in the last 2 feet, and thus contains 100 board feet according to the log-scale table. At a length of 14 feet from the large end it measures 16 inches in diameter. If it had been cut to this length, it would scale 126 board feet (over one-fourth more) and should bring \$15 a thousand board feet more

because of the greater diameter. This is illustrated by the sketch in Figure 7.

This does not mean that it is always advisable to cut short logs. As already stated, firms generally specify that there shall be not more than a certain percentage of logs under certain lengths.

Some log buyers take the diameter measure of long logs at some specified distance from the small end. This method of measurement is commendable because, while avoiding loss from taper and corresponding loss in diameter, it takes full advantage of length of log.

All logs are required to be cut at least 2 inches longer than the even foot; for instance, a log 9 feet long must measure at least 9 feet 2 inches. This is to allow for squaring the ends of the boards at the mill. Cutting the logs more than 4 to 6 inches over the even foot is wasteful to the seller because the extra length does not increase the log scale.

In felling the tree the cut should be made as near the ground as possible in order to get the advantage of the more valuable large-sized material. Figure 8 shows a tree properly felled so that there is a minimum amount of waste. Where the stump is of value, the tree should be cut at the roots as described in the next section. For

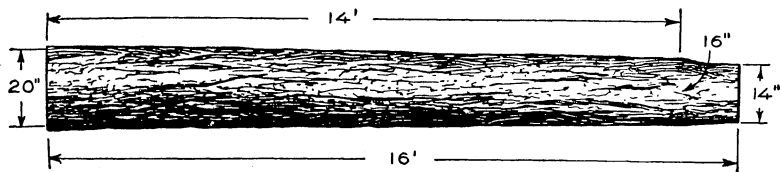


Fig. 7.—How a log 14 inches in diameter at the small end, 16 feet long, and containing 100 board feet, might have been cut into a log 14 feet in length, 16 inches in diameter at the small end, containing 126 board feet

this reason it is advantageous to have the buyer look over the timber before it is felled so that he may indicate any stumps which may be of value.

Care should be exercised in felling walnut, especially if there is a large crotch, as the wood is inclined to split. If the crotch strikes the ground with considerable force it may split below the fork and extend a long distance into the large trunk, causing much loss.

The side on which the tree is to be felled should be deeply undercut; otherwise splinters are likely to be pulled out of the butt log, which lessens the value of that log. Buyers generally make the same deductions for logs with splinter pull as for logs with hollow or rotten centers.

STUMPS AND CROTCHES

Figured stumps should be dug up in order to include all of the valuable wood. If the tree is felled by cutting off the roots, this will save much labor in getting the stump out of the ground. This can usually be done without damage to the stump. After the stump has been gotten out, the root spurs along the side should be cut off nearly flush with the surface of the trunk and the base squared off by sawing. Only the solid portion of the stump can be used, and the root spurs if left on the trunk will cause much inconvenience in handling and shipment. The proper method of trimming stumps is shown in Figure 9. Crotches are often of special value for veneer and should be cut about the same length as stump wood, as described on page 4.

STORING CUT TIMBER

Logs should not be left lying for a long time on the ground; and if the ground is moist, they should not be in contact with the earth for more than about a week. They should be raised at least 6 inches off the ground and protected as much as possible from excessive heat of the sun by being piled under the shade of trees or under a tem-



Fig. 8.—A black walnut tree felled with the cut close to the ground in order to include in the log as much as possible of the valuable large sized timber

porary shelter. Unless the logs are to be shipped at once, the ends should be painted to help prevent decay and to retard their drying out, thus helping also to keep them from checking. If the ends of the logs are checked at the time of felling, it is customary for the cutters to make a blunt cut with a wedge across the outer ends of the check. This helps to prevent the check from extending still farther.

LOG WEIGHTS AND FREIGHT RATES

Since, as already stated, the value of black-walnut timber of the same size and quality varies greatly with the distance from the market, it is advantageous for the prospective seller to be able to figure the costs from the tree to the factory even though such costs can only be approximated. Freight costs constitute a large item in marketing walnut logs, particularly if the distance is great. Table 4 gives the approximate weights of several sizes of walnut logs in the green and in the air-dry state. Since the air-dry condition is reached only after logs have lain under favorable drying conditions for a year or more, these figures serve merely as a guide in determining the log weights. Logs dry out much faster at first than as they approach the air-dry condition, and large logs dry out much more

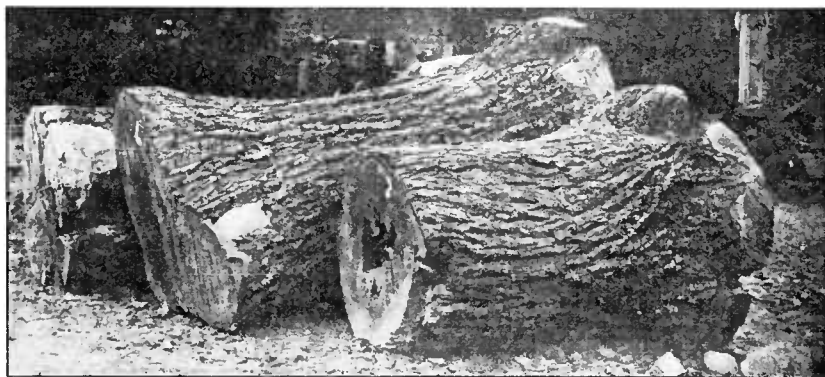


FIG. 9.—Walnut stumps with roots properly trimmed. The big one with a crotch is particularly valuable for making veneers. The stump in the foreground has a hollow center. This does not necessarily spoil an otherwise valuable veneer log for, unless the hole is too large, the log can be mounted on the lathe and the veneer cut from it

slowly than small logs. Small logs might lie as long as a week even under favorable drying conditions and still be practically green, and larger logs two or three weeks without drying out appreciably.

In using Table 4 multiply separately for each diameter size the total amount of timber expressed in thousands of board feet by the weight per 1,000 board feet for that diameter size. Then add the amounts of all diameter sizes together to get the total weight.

TABLE 4.—*Approximate weights of black walnut logs*

Diameter of log inside bark at small end	Weight per 1,000 board feet log scale, Doyle rule		Diameter of log inside bark at small end	Weight per 1,000 board feet log scale, Doyle rule	
	Green	Air dry		Green	Air dry
<i>Inches</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Inches</i>	<i>Pounds</i>	<i>Pounds</i>
12	11,900	8,200	19	8,000	5,560
13	10,900	7,500	20	7,750	5,360
14	10,200	7,000	21	7,600	5,200
15	9,500	6,500	22	7,400	5,100
16	9,000	6,200	23	7,250	5,000
17	8,600	5,900	24	7,100	4,900
18	8,300	5,700			

Following is an example of the use of the weight table:

From the list of logs (see p. 7), prepared to show the scale of each log, add together the scale of all the 12-inch diameter logs, all of the 13-inch, etc. Suppose that altogether there are 1,500 board feet of logs measuring 12 inches at the small end. Logs of this diameter class will, in the green condition, average about 11,900 pounds for each 1,000 board feet. This would make the total weight of the 12-inch logs 17,850 pounds. By obtaining the weight in this way for each diameter size and adding all together, the total weight is obtained. This is, however, only a rough method of determining the weight and freight cost, since logs of the same diameter and length will vary considerably in weight.

By ascertaining from the local railway agent the freight rate to the prospective market, the approximate freight cost can be determined. When the mills pay the freight, the smallest quantity acceptable as a carload is generally 3,000 board feet log scale for logs which are at least of average size and quality. A smaller quantity will be accepted by some firms if the logs are of unusually high grade or if they are figured.

A freight car will hold from 4,000 to 7,000 board feet of logs, depending mainly on the diameter size of the logs. The smaller the logs the less the quantity in board feet that the car will hold.

COSTS OF FELLING AND HAULING

The following costs are those generally used by timber buyers and are given for the purpose of helping the owner to determine how profitable it will be for him to do the cutting and hauling.

Felling costs are generally figured at from \$5 to \$10 a thousand board feet. At the usual wage scale they should be much less for the farmer who fells his own timber. Hauling logs to the railroad is an important factor in marketing walnut, and the cost varies with the distance, with the character of the country over which the hauling is to be done, and with the kind of roads. Three hundred board feet of average-size logs weighs about 2,500 pounds and is considered a large wagonload. A large motor truck such as is used by loggers will carry much more, however, and make more frequent trips. Under fairly good hauling conditions the cost of a 5 to 10-mile team haul is generally figured at from \$15 to \$30 a thousand board feet, or at the rate of about \$3 a mile for each 1,000 feet. If the timber is scattered and the country rough, the cost may amount to \$4 per thousand per mile.

Although the costs of the different operations from the standing timber to the mill yard may vary considerably with individual operations and the general scale of wages, the following may be considered as average, per 1,000 board feet Doyle log scale:

Felling-----	\$5 to \$10
Hauling and loading on cars-----	15 to 30
Freight-----	15 to 20
Total-----	35 to 60

This means that if the farmer cuts the trees, hauls the logs a distance of 5 to 10 miles to the railroad, and loads them on the cars, he should get from \$20 to \$40 more for each 1,000 board feet log scale that he handles than he would for the timber standing.

These costs are high for cutting and hauling logs, but this is because walnut is so scattered. Commonly only one or two trees may be found in a place and the different trees so widely separated that they must be transported for long distances. The costs given are those which prevailed during and shortly after the World War and are fairly representative of present conditions.

SOURCES OF ADDITIONAL INFORMATION

There are several possible sources from which the farmer may obtain valuable assistance in marketing his timber. The county agricultural agent and the forestry department of his State (where there is such a department) may be able to advise him how to cut and measure the timber. They may also be able to help him dispose of it advantageously. The Forest Service, United States Department of Agriculture, will furnish a list of firms purchasing walnut logs and any available detailed information which will be helpful in marketing these timber products.

The following bulletins may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., for the prices given in each case. Remittance must be made by money order or can be sent in coin at the sender's risk:

Farmers' Bulletins:

1210. Measuring and Marketing Farm Timber. 5 cents.

1392. Black Walnut for Timber and Nuts. 5 cents.

1123. Growing and Planting Hardwood Seedlings. 5 cents.

The following is a list of the executive officers in charge of the State forestry departments in the important walnut-producing States:

Illinois.—Superintendent, Department of Conservation, Division of Forestry, Springfield.

Indiana.—State forester, Department of Conservation, Division of Forestry, Indianapolis.

Iowa.—Secretary and forester, State Department of Agriculture, Des Moines.

Kansas.—State forester, State Agricultural College, Division of Forestry, Manhattan.

Kentucky.—State forester, Kentucky State Forest Service, Frankfort.

Maryland.—State forester, State Department of Forestry, 1411 Fidelity Building, Baltimore.

Michigan.—Director, Department of Conservation, Lansing.

New Jersey.—State forester, Department of Conservation and Development, Division of Forests and Parks, State Office Building, Trenton.

North Carolina.—State forester, Department of Conservation and Development, Division of Forestry, Raleigh.

Ohio.—State forester, Agricultural Experiment Station, Department of Forestry, Wooster.

Pennsylvania.—Secretary, Department of Forests and Waters, Harrisburg.

Tennessee.—State forester, Department of Agriculture, Division of Forestry, Nashville.

Virginia.—State forester, Virginia Conservation Commission, Virginia Forest Service, Charlottesville.

West Virginia.—Chief forester, Game, Fish and Forestry Commission, Charleston.

Wisconsin.—Superintendent of forests and parks, State Conservation Commission, Madison (address correspondence to Director, State Conservation Commission, Madison).

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<i>Weather Bureau</i> -----	FRANCIS W. REICHELDERFER, <i>Chief</i> .